

Atrial Fibrillation during an Exploration Class Mission

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Background: A long-duration exploration class mission is fraught with numerous medical contingency plans. Herein, we explore the challenges of symptomatic atrial fibrillation (AF) occurring during an exploration class mission. The actions and resources required to ameliorate the situation, including the availability of appropriate pharmaceuticals, monitoring devices, treatment modalities, and communication protocols will be investigated.

Challenges of Atrial Fibrillation during an Exploration Mission: Numerous etiologies are responsible for the initiation of AF. On Earth, we have the time and medical resources to evaluate and determine the causative situation for most cases of AF and initiate therapy accordingly. During a long-duration exploration class mission resources will be severely restricted. How is one to determine if new onset AF is due to recent myocardial infarction, pulmonary embolism, fluid overload, thyrotoxicosis, cardiac structural abnormalities, or CO poisoning? Which pharmaceutical therapy should be initiated and what potential side effects can be expected? Should anti-coagulation therapy be initiated? How would one monitor the therapeutic treatment of AF in microgravity? What training would medical officers require, and which communication strategies should be developed to enable the best, safest therapeutic options for treatment of AF during a long-duration exploration class mission?

Summary: These questions will be investigated with expert opinion on disease elucidation, efficient pharmacology, therapeutic monitoring, telecommunication strategies, and mission cost parameters with emphasis on atrial fibrillation being just one illustration of the tremendous challenges that face a long-duration exploration mission. The limited crew training time, medical hardware, and drugs manifested to deal with such an event predicate that aggressive primary and secondary prevention strategies be developed to protect a multibillion-dollar asset like the International Space Station or a mission to the Moon or Mars.

Learning Objectives: The audience will become familiar with the risks and challenges inherent to developing a therapeutic strategy for the treatment of atrial fibrillation during a long-term exploration class mission.